

9233

Diag. Cht. Nos. 1208-2 & 1107

NOAA FORM 76-35A

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY

DESCRIPTIVE REPORT (HYDROGRAPHIC)

Type of Survey HYDROGRAPHIC
Field No. PE-20-3-71
Office No. H-9233

LOCALITY

State Massachusetts
General Locality Cape Cod
Locality Nauset Beach Lighthouse to Chatham

19 71

CHIEF OF PARTY
Bruce I. Williams

LIBRARY & ARCHIVES

DATE

April 17, 1978

☆ U.S. GOV. PRINTING OFFICE: 1976-669-441

9233

Quia

Cht

13246 (1208)

13248 (270)

13237 (1209)

✓ 13009 (71)

✓ 13200 (107)

13003 (1000)

13006 (20)

APR 8-24-79 R Wilson

APR 8-23-79 AR

APR 8-23-79 AR

APR 8-30-79 R Wilson

APR 6-23-81 R W

H-9233

HYDROGRAPHIC TITLE SHEET

INSTRUCTIONS - The Hydrographic Sheet should be accompanied by this form,
filled in as completely as possible, when the sheet is forwarded to the Office.

FIELD NO.

PE-20-3-71

State MassachusettsGeneral locality Cape CodLocality Beach Lighthouse to Chatham
Nauset HarborScale 1:20,000Date of survey 28 Sept. - 30 Oct., 1971Instructions dated 27 April, 1971Project No. OPR-473-PE-71Vessel NOAA Ship PEIRCE, Launches PE 182 and Skiff No 3Chief of party Cdr. Bruce I. WilliamsSurveyed by LTJG P.S. Hudes, LTJG T.W. RichardsSoundings taken by echo sounder, hand lead, pole echo sounder and sounding poleGraphic record scaled by survey techniciansGraphic record checked by ships officersProtracted by ships officersAutomated plot by Cad Comp Plotter AMCSoundings penciled by ---Soundings in ~~X~~ fathoms feet at MLW ~~XXXX~~

REMARKS:

Cat. 1 HDEG survey changed to
Cat. 4 to complete Review, Insp. & Sig.
3-20-79

4-24-78
app'd To stds. Wjt.

R.W.W. 11/1/91

DESCRIPTIVE REPORT

TO ACCOMPANY

HYDROGRAPHIC SURVEY PE-20-3-71 (H-9233)

NOAA SHIP PEIRCE

SCALE 1:20,000

BRUCE I. WILLIAMS

CHIEF OF PARTY

A. PROJECT

This survey was accomplished under PROJECT INSTRUCTIONS, ✓
OPR-473-PE-71, Cape Ann to Cape Cod, dated 27 April, 1971,
and CHANGE NO. 1, AMENDMENT TO PROJECT INSTRUCTIONS, dated
24 May, 1971. All previous instructions pertaining to
this project are superseded.

B. AREA SURVEYED

Field work was started on 28 September and was completed ✓
on 30 October, 1971. The general area is east of Cape Cod
between Wellfleet and Chatham Massachusetts.

The survey is bounded on the north by contemporary surveys ✓
H-9226 (PE-20-1-71) and H-9232 (PE-20-2-71). It junctions
on the east with H-5276, 1:100,000, 1932. The survey is
bounded on the south by surveys H-8349, 1:10,000, 1956,
and H-8350, 1:20,000, 1956. (H-5276, H-8349, H-8350 not contemporary)

C. SOUNDING VESSEL

Hydrography was accomplished using the following vessels: ✓

Ship PEIRCE - position numbers inked in brown
Launch PE-1 - position numbers inked in blue
Launch PE-2 - position numbers inked in red
Skiff #3 - position numbers inked in green

D. SOUNDING EQUIPMENT

All soundings taken with the ship were observed with a ✓
Raytheon Fathometer, Model 723, serial number 928. All
soundings were recorded in feet. Reduced soundings up
to 254 feet were taken with fathometer 928. The initial
was held at 9.0 feet. Velocity corrections were obtained
by combining leadline comparisons and nansen cast data.

Soundings taken with the launches were also recorded on ✓
Model 723 fathometers. Launch PE-1 had serial number 242
and launch PE-2 had serial number 921. Reduced soundings
up to 87 feet were taken with number 242. Reduced soundings

up to 66 feet were taken with number 921. The initials ✓ were held at 2.0 feet.

Bar checks were taken daily. Four bar checks for PE-1 ✓ and one bar check for PE-2 were taken. Three of the four checks for PE-1 were rated poor or fair. Therefore the final bar check corrections for this survey were obtained from surveys PE-10-2-71⁽⁶⁻⁷¹⁾ and PE-20-1-71⁽⁶⁻⁷¹⁾ due to the small number of values obtained. The previous results were combined with data from nansen cast 4 to obtain final launch correctors.

A 16 foot pole graduated in 1 foot increments was used ✓ with the skiff to locate rocks on the survey. The low water line was partially located by walking the shoreline.

E. SMOOTH SHEET

All field records will be transmitted to AMC for smooth ✓ computer plotting. Field records were encoded on punched paper tape in accordance with instructions and formats listed in the AMC Manual. A single "on-line" position and sounding tape was used for all vessels.

F. CONTROL

Hi-Fix electronic control on a frequency of 1718.59 Khz ✓ was used for position control of the ship. The Hi-Fix was operated in the range-range mode. Stations were located at CHATHAM 1971 and NAUSET HI-FIX 1971.

Hi-Fix calibration was accomplished using three-point ✓ sextant fixes. The 1:20,000 boat sheet was used as a calibration sheet. The calibration signals were triangulation stations.

Visual control was used for all work involving the launches ✓ and skiff. Three-point sextant fixes were utilized on triangulation and photogrammetric points. The fixes were plotted with a plastic three-arm protractor.

Photogrammetric signals were located by Photogrammetric ✓ Field Party 62, E. W. Hartford, Chief of Party. The signals were scaled from 1:10,000 manuscripts and replotted on the 1:20,000 boat sheet. The following manuscripts were used: TP-00169, TP-00170, TP-00171^(a) (Incomplete compilations pending field edit).

Positions of photo signals were scaled in degrees, minutes, ✓

and meters from the manuscripts and logged on a signal tape to be submitted for smooth plotting. Triangulation station G.P.'s were obtained from the G.P. cards and logged to the nearest meter on the signal tape. ✓

G. SHORELINE

The shoreline was transferred from 1:20,000 copies of manuscripts TP-00169, TP-00170, and TP-00171. A portion of the high water line around Nauset Harbor was revised by the hydrographer. See Review par. 1

The low water line between the northern limits of the sheet and the Nauset Harbor entrance was obtained by running the launch at high water. The low water line between Nauset and the southern limits of the sheet was obtained by walking at low water. ✓

H. CROSSLINES

Crosslines were run at 9% of the total mileage. Crosslines are in good agreement. ✓

I. JUNCTIONS See review par 4

The soundings and depth curves are in good agreement between this survey and H-9226 on the northern inshore limit. ✓

The survey H-5276 is from 5 to 15 feet deeper than the present survey in depths of from 100 to 230 feet. The application of velocity and TRA corrections to survey H-9233 should bring the soundings into better agreement.

Agreement with H-8349 and H-8350 on the southern limit is fair.

J. COMPARISON WITH PRIOR SURVEYS

Presurvey review item #5 was not investigated and no investigation was required. No trace of this wreck was observed on the fathograms. See Review par 6a (1)

The questionable sounding of 79 feet at Latitude 41° 42' 52" Longitude 69° 51' 19" was not investigated as required.
 Disregard 79 - Probable error in recording on H-570(1856)

K. COMPARISON WITH THE CHART

A comparison was made with C&GS Chart 1208, 15th Edition,

[13246]

October 31, 1970.

At latitude $41^{\circ} 50'$ the 120 foot curve from this survey is 0.4 nautical miles offshore from the charted curve. At latitude $41^{\circ} 50'$ the 60 foot curve from this survey is 0.4 nautical miles inshore of the 60' charted curve. Along the entire shoreline there are deeps and ridges within 0.5 nautical miles of the beach which do not appear on the chart. *Extremely changeable area. Application of present survey information is recommended by the reviewer.*

L. ADEQUACY OF THE SURVEY

This survey is complete and adequate with the exception of the undeveloped questionable sounding listed in section 'J'.

M. AIDS TO NAVIGATION

There was one buoy located on this survey. The position ✓ agreed within 0.1 minute of the location listed in the Light List. The position as scaled from chart 1208 was latitude $41^{\circ} 41' 42''$, longitude $69^{\circ} 49' 56''$. The boat sheet position was $41^{\circ} 41' 45''$, and $69^{\circ} 50' 06''$. The boat sheet position will change when final Hi-Fix correctors are applied to the survey.

N. STATISTICS

Positions	PE-1	PE-2	Ship	Skiff
Nautical miles of sounding line	606	236	904	65
Square nautical miles surveyed	157	51.9	294.6	0
Bottom samples	11	5	56	0
Nansen cast	0	0	31	0
Crosslines	0	0	1	0
	16.6	4.0	24.6	0

O. MISCELLANEOUS

All tapes were logged on the 000° time meridian.

The project instructions called for tide gages to be installed at Nauset Harbor Entrance (outside) and Nauset Beach, south end (outside). Neither of these gages were installed during this survey due to the previous problems encountered with gages installed on the open coast and the weather conditions expected near the end of the field season in October. A gage was installed at Nauset Harbor Entrance inside the point and bars which protect the entrance (latitude $41^{\circ} 48' 33''$, longitude $69^{\circ} 56' 25''$). A comparison staff was installed on the ocean side of the

point where the gage and staff were installed. The comparison staff was inshore of a bar which is covered at high water but causes breakers which reduce much of the height of onshore swells. A series of observations totalling 9.5 hours were taken on day 287. The comparison staff was then destroyed. It is hoped that these comparison readings will give an indication of the error resulting from installing the gage inshore whereas the survey is offshore from Nauset Harbor Entrance. The tide gage marigrams and the comparison staff readings have been forwarded to C3311 in Rockville.

P. REFERENCES TO REPORTS

SEASONS REPORT, NOAA SHIP PEIRCE, 1971
ELECTRONIC SYSTEMS CALIBRATION REPORT, OPR-473-PE-71
REPORT ON CORRECTIONS TO ECHO SOUNDINGS, OPR-473-PE-71

Very Respectfully

John O. Rolland
John O. Rolland
for
Peter S. Hudes
LTJG, NOAA

Approved and Forwarded

Bruce I. Williams
Bruce I. Williams
Cdr., NOAA
Commanding Officer
NOAA Ship PEIRCE

APPROVAL SHEET

PE-20-3-71 (H-9233)

Field work was accomplished under my immediate daily supervision. The boat sheet and all field records have been reviewed and are approved. This survey is complete and adequate to supersede prior surveys for charting.



Bruce I. Williams
Cdr., NOAA
Commanding Officer
NOAA Ship PEIRCE

ABSTRACT OF VELOCITY CORRECTIONS

For this survey velocity table #1 was used for launch PE-1 (fathometer 242) for the period 28 September to 29 October (days of hydrography 271, 286, 287, 301, 302).

Table #2 was used for launch PE-2 (fathometer 921) on 28 October, day 301.

Table #3 was used for the ship PEIRCE (fathometer 928) from 20 October to 27 October (days 293, 294, 295, 299, and 300).

Table #4 is to be used to correct all soundings obtained by skiff or while walking the shoreline.

Refer to the special REPORT ON CORRECTIONS TO ECHO SOUNDINGS, OPR-473-PE-71 for the complete determination of these tables.

Velocity Table #1

<u>Depth (to)</u>	<u>Corr.</u>
5.2	-0.8
6.9	-0.6
10.0	-0.4
20.0	-0.2
25.6	0.0
34.2	+0.2
43.5	+0.4
53.2	+0.6
63.2	+0.8
73.3	+1.0
83.5	+1.2
999.9	+1.4

Velocity Table #2

<u>Depth (to)</u>	<u>Corr.</u>
4.1	-0.6
6.8	-0.8
20.2	-1.0
26.8	-0.8
31.3	-0.6
37.8	-0.4
45.5	-0.2
52.6	0.0
61.2	+0.2
70.6	+0.4
81.1	+0.6
92.0	+0.8
999.9	+1.0

Velocity Table #3

<u>Depth (to)</u>	<u>Corr.</u>
32.0	+0.8
40.0	+1.0
50.0	+1.2
60.0	+1.4
69.0	+1.6
79.0	+1.8

Velocity Table #3 (continued)

<u>Depth (to)</u>	<u>Corr.</u>
90.0	+2.0
101.0	+2.2
112.0	+2.4
125.0	+2.6
138.0	+2.8
152.0	+3.0
166.0	+3.2
182.0	+3.4
199.0	+3.6
216.0	+3.8
236.0	+4.0
261.0	+4.2
999.9	+4.4

Velocity Table #4

<u>Depth (to)</u>	<u>Corr.</u>
999.9	0.0

VELOCITY TAPE
 OPR 473
 PE 20-3-71

DEPTH	I N D	VEL CORR	TAB NO	UNIT	VES ID	SHEET
000052	1	0008	0001	000	283100	009233
000069	1	0006				
000100	1	0004				
000200	1	0002				
000256	0	0000				
000342	0	0002				
000435	0	0004				
000532	0	0006				
000632	0	0008				
000733	0	0010				
000835	0	0012				
999999	0	0014				
000041	1	0006	0002	000	283200	009233
000068	1	0008				
000202	1	0010				
000268	1	0008				
000313	1	0006				
000378	1	0004				
000455	1	0002				
000526	0	0000				
000612	0	0002				
000706	0	0004				
000811	0	0006				
000920	0	0008				
999999	0	0010				
000320	0	0008	0003	000	283000	009233
000400	0	0010				
000500	0	0012				
000600	0	0014				
000690	0	0016				
000790	0	0018				
000900	0	0020				
001010	0	0022				
001120	0	0024				
001250	0	0026				
001380	0	0028				
001520	0	0030				
001660	0	0032				
001820	0	0034				
001990	0	0036				
002160	0	0038				
002360	0	0040				
002610	0	0042				
999999	0	0044				
999999	0	0000	0004	000	283300	009233

ABSTRACT OF CORRECTIONS TO DISTANCE MEASUREMENTS

Hi-Fix range-range control was used for vessel 2830 during this survey. Refer to the Electronic Systems Calibration Report for original data.

<u>Day #</u>	<u>Time (from)</u>	<u>Corr. Pat 1</u>	<u>Corr. Pat 2</u>	<u>Remarks</u>
293	132800	-0.20	+0.24	calibration #1
293	170400	-4.20	+0.24	gained 4 lanes
293	170600	-3.20	+0.24	lost 1 lane
294	003700	-0.20	+0.24	
294	035500	-1.20	+0.24	gained 1 lane
295	000000	-1.20	+0.24	
299	171000	-0.20	+0.24	
300	121600	-0.20	+0.24	

A copy of the ship corrector tape follows. Long words logged in addition to the above calibration corrections are used to correct position errors in the smooth printouts.

ABSTRACT OF TRA CORRECTIONS

The TRA corrector is a combination of corrections that apply to soundings. The TRA correctors are included in the TC/TI tape.

TRA is comprised by the following factors:

Transducer Draft

No draft corrections are applied to any of the vessels used on this survey. The averaging of bar checks for the launches eliminates this factor. The ship work was accomplished in two days and a leadline comparison was taken.

Instrument Error

Velocity corrections were obtained by bar checks and leadline comparisons. Any constant instrumental error is accounted for in the velocity tables.

Settlement and Squat

The settlement and squat applied is as follows:

<u>Ship PEIRCE (2830)</u>	
standard speed	+0.9 feet
2/3 speed	+0.4 feet

<u>Launches PE-1 & PE-2</u>	
<u>rpm (to)</u>	<u>correction</u>
840	0.0
1160	+0.1
2160	+0.2
2350	+0.1

Refer to the REPORT ON CORRECTIONS TO ECHO SOUNDINGS for original data.

Phase Correction

No phase comparisons were obtained for fathometer 928. No phase error was observed on fathometer 921. Data from survey PE 10-2-71 indicated that -0.3 feet should be applied to all soundings on "B" scale, and -0.1 feet should be applied to all soundings on "C" scale.

PHASE CORRECTION LAUNCH PE-1 FATHOMETER # 242

<u>DAY</u>	<u>TIME</u>	<u>CORRN.</u>	<u>DAY</u>	<u>TIME</u>	<u>CORRN.</u>
271	131700	-0.3	287	173125	0.0
	132200	0.0		174215	-0.3
	133200	-0.3		175440	0.0
	133920	0.0		182150	-0.3
	134915	-0.3		183320	0.0
	135735	0.0		184430	-0.3
	140615	-0.3		185620	0.0
	141645	0.0		190905	-0.3
	144905	-0.3		192140	0.0
	150245	0.01	301	195440	-0.3
	151145	-0.3		121430	-0.3
	152605	0.0		121920	0.0
	153445	-0.3		122845	-0.3
	154845	0.0		123640	0.0
	163835	-0.3		130130	-0.3
	165230	0.0		130540	-0.0
	170110	-0.3		131500	-0.3
	171515	0.0		132500	0.0
	172345	-0.3		133245	-0.3
	173740	0.0		134310	0.0
	174615	-0.3		135040	-0.3
	180315	0.0		140050	0.0
	185215	-0.3		140940	-0.3
	190640	0.0		141940	0.0
	191550	-0.3		142810	-0.3
	193005	0.0		143750	0.0
	193840	-0.3		144820	-0.3
	195240	0.0		145740	0.0
	200140	-0.3		150650	-0.3
286	124600	-0.3		151520	0.0
	125120	0.0		152520	-0.3
	130515	-0.3		153350	0.0
	131845	0.0		154415	-0.3
	132815	-0.3		155220	0.0
	134115	0.0		163135	-0.3
	135315	-0.3		163825	0.0
	140645	0.0		165005	-0.3
	143915	-0.3		165720	0.0
	144405	-0.1		171655	-0.3
	144620	-0.3		172305	0.0
	145120	0.0		173520	-0.3
	150220	-0.3		173950	0.0
	151335	-0.1		175120	-0.3
	151440	-0.3		175710	0.0
	162230	0.0		180750	-0.3
	171220	-0.3		181510	0.0
287	164700	0.0		182550	-0.3
	165245	-0.3		183145	0.0
	170520	0.0		184340	-0.3
	171915	-0.3		184905	0.0

<u>DAY</u>	<u>TIME</u>	<u>CORRN.</u>
301	190120	-0.3
	190450	0.0
	191720	-0.3
	192215	0.0
	193235	-0.3
	193400	0.0
	202515	-0.3
	204610	0.0
302	121030	0.0
	150240	-0.3
	152500	0.0
	152940	-0.3
	153705	0.0
	171935	-0.3
	173345	0.0
	174735	-0.3
	174845	0.0
	191840	-0.3
	192220	0.0

Initial Correction

An abstract of initial corrections for each vessel follows.

A TC/TI tape is logged for the skiff work with a zero TRA value.

INITIAL CORRECTION PE20-3-71, LAUNCH PE-1

<u>DAY</u>	<u>TIME(from)</u>	<u>CORR.</u>
271	131700	0.0
	173030	-0.1
	173735	0.0
	180315	+0.1
	191430	0.0
	194555	-0.2
	195245	0.0
286	124600	0.0
287	164700	0.0
	165030	-0.2
	165620	0.0
301	121430	-0.2
	123730	0.0
	125700	+0.4
	130530	0.0
	141500	-0.1
	142000	0.0
	163400	-0.2
	163845	0.0
302	121030	0.0
	131200	-0.2
	132245	0.0
	134030	-0.1
	135115	0.0
	184500	-0.2
	185100	0.0

INITIAL CORRECTION PE 20-3-71 LAUNCH PE-2

<u>DAY</u>	<u>TIME(from)</u>	<u>CORR.</u>
301	113330	0.0
	152500	+0.2
	152830	0.0

INITIAL CORRECTION PE 20-3-71, SHIP PEIRCE 2830

<u>DAY</u>	<u>TIME(from)</u>	<u>CORR.</u>
293	135200	0.0
	201500	+0.2
	204300	0.0
294	003700	0.0
	030300	-0.2
	031530	0.0
	035700	-0.2
	041100	0.0
	061700	-0.2
	063030	0.0
	065300	-0.2
	071700	0.0
	134400	+0.2
	134800	+0.4
	135300	0.0
	142600	-0.2
	143500	0.0
	162430	-0.3
	164130	0.0
	173830	-0.2
	175900	0.0
295	000000	0.0
	021200	-0.2
	023145	0.0
	024800	-0.2
	030115	0.0
	030645	-0.2
	031215	0.0

ABSTRACT OF SPEED CHANGES SHIP PEIRCE

<u>DAY</u>	<u>TIME(from)</u>	<u>SPEED</u>	<u>CORR.</u>
293	135200	s/s	+0.9
294	003700	s/s	+0.9
295	000000	s/s	+0.9

LAUNCH PE-2

		rpm	
301	113330	2000	+0.2

LAUNCH PE -1

271	131700	2200	+0.1
	174230	2000	+0.2
	184830	2200	+0.1
286	124600	2000	+0.2
	151200	2200	+0.1
287	164700	2200	+0.1
301	121430	standing st.	0.0
	121500	2200	+0.1
302	121030	1500	+0.2
	134730	2200	+0.1

LIST OF SIGNALS ON H-9233

<u>EDP #</u>	<u>SOURCE</u>
114	TP-00169
116	"
118	"
120	"
122	"
124	"
126	"
128	"
130	"
132	"
134	"
136	"
138	"
140	"
142	"
144	"
146	"
148	"
143	"
101	"
001	CAMP WELLFLEET FIRING RANGE TANK 1958
010	NAUSET LIGHTHOUSE 1932 36 r 1941
015	POCHET HOUSE CHIMNEY 1909
020	ORLEANS COAST GUARD STATION SIGNAL MAST 1934
030	OLD HARBOR COAST GUARD STATION SIGNAL MAST 1934 r 1940
040	COAST GUARD STATION NO. 41 1920 34 r 1940
050	CHATHAM STANDPIPE 1931 37 r 1958
060	CHATHAM SOUTH LIGHTHOUSE 1880 1934 r 1954
150	TP-00170
152	"
154	"
156	"
158	"
160	"
162	"
164	"
166	"
168	"
170	"
172	"
171	"
174	"
176	"
180	"
182	"

List of signals (cont)

<u>EDP #</u>	<u>SOURCE</u>
184	TP-00170
186	"
188	TP-00171
190	"
192	"
194	"
196	"
198	"
200	"
202	"
204	"
206	"
208	"
210	"
212	"
214	"
216	"
218	"
220	"
222	"
224	"
226	"

Signal List Tape
PE-20-3-71 (H-9233)

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#	Latitude ° ' Met	Longitude ° ' Meters
114	41 53 0858	069 57 1016 —
116	41 53 0394	069 57 0880
118	41 53 0013	069 57 0796
120	41 52 1439	069 57 0669
122	41 52 1084	069 57 0587
124	41 52 0765	069 57 0504
126	41 52 0339	069 57 0398
128	41 52 0023	069 57 0330
130	41 51 1588	069 57 0248
132	41 51 1222	069 57 0159
134	41 51 0951	069 57 0098
136	41 51 0633	069 57 0013
138	41 51 0281	069 56 1310
140	41 50 1700	069 56 1230
142	41 50 1230	069 56 1152
144	41 50 0740	069 56 1019
146	41 50 0384	069 56 0943
148	41 50 0003	069 56 0864
143	41 50 1100	069 56 1252
101	41 54 1551	069 58 0443 —
001	41 54 0681	069 58 0610 — 41 54 22.062 69 58 26.453
010	41 51 1166	069 57 0215 — 41 51 37.796 69 57 09.309
015	41 46 0210	069 56 0501 — 41 46 06.80 69 56 21.70 no check
020	41 45 1398	069 56 0052 — 41 45 45.322 69 56 02.261
030	41 41 1573	069 55 1053 — 41 41 50.98 69 55 45.54 no check
040	41 41 1557	069 55 1072 — 41 41 50.475 69 55 46.343
050	41 41 1161	069 58 0732 — 41 41 37.625 69 58 31.673
060	41 40 0514	069 57 0036 — 41 40 16.672 69 57 01.571
150	41 49 1428	069 56 0772
152	41 49 0981	069 56 0706
154	41 49 0586	069 56 0658
156	41 49 0204	069 56 0654
158	41 48 1738	069 56 0584
160	41 48 1397	069 56 0681
162	41 48 0940	069 56 0716
164	41 48 0538	069 56 0310
166	41 48 0092	069 56 0279
168	41 47 1369	069 56 0539
170	41 47 0505	069 56 0418
172	41 46 1206	069 56 0533
171	41 46 1653	069 56 0160
174	41 46 0802	069 56 0055
176	41 46 0328	069 55 1379
180	41 45 1747	069 55 1349
182	41 45 0958	069 55 1279
184	41 45 0445	069 55 1222
186	41 45 0055	069 55 1190
188	41 44 1548	069 55 1183
190	41 44 1209	069 55 1143
192	41 44 0860	069 55 1125
194	41 44 0417	069 55 1101
196	41 44 0000	069 55 1147
198	41 43 1424	069 55 1097

47

200	41	43	1055	069	55	1083
202	41	43	0635	069	55	1072
204	41	43	0175	069	55	1073
206	41	42	1643	069	55	1088
208	41	42	1199	069	55	1034
210	41	42	0794	069	55	1045
212	41	42	0321	069	55	1063
214	41	41	1767	069	55	1044
216	41	41	1224	069	55	1116
218	41	41	0795	069	55	1097
220	41	41	0459	069	55	1118
222	41	41	0041	069	55	1176
224	41	40	1438	069	55	1266
226	41	40	1024	069	55	1360
377	41	41	0003	069	56	1346
379	41	51	1187	069	57	0194

ATLANTIC MARINE CENTER
ELECTRONIC CONTROL PARAMETERS

50

1. Project # OPR-473 2. Reg. # H-9233 3. Field # PE-20-3-71
4. Type of Control Hi-Fix and Visual (Hi-Fix, Raydist, EPI, etc.)
5. Frequency 1718.59 (for conversion of electronic lanes to meters)
6. Mode of Operation (check one):

Range-Range ☒

Range-Visual ☐

Range One (R₁)
Station I.D. Chatham 1971
Range Two (R₂)
Station I.D. Nauset Hi-Fix 1971

Lat. 41° 41' 00.117"
Long. 69° 56' 59.079"
Lat. 41° 51' 38.482"
Long. 69° 57' 08.440"

Hyperbolic (3-station) ☐

Hyper-Visual ☐

Slave One
Station I.D. _____
Master
Station I.D. _____
Slave Two
Station I.D. _____

Lat. _____° _____' _____"
Long. _____° _____' _____"
Lat. _____° _____' _____"
Long. _____° _____' _____"
Lat. _____° _____' _____"
Long. _____° _____' _____"

7. Location of Survey:

Range-Range ☒

Imagine an observer is standing at R₁ Station and looking directly at R₂ (check one):

Survey area is to observer's Right ☒ A=0

Survey area is to observer's Left ☐ A=1

Hyperbolic ☐

Looking from survey area toward Master Station:

Slave One must be to observer's Left.

Slave Two must be to observer's Right.

8. ☐ This form is submitted as an aid in preparing a boat sheet.
- ☐ This form applies to all data on this survey.
- ☒ This form applies to part of the data on this survey.

Vessel EDP #	From Time Day	To Time Day	Position Numbers (inclusive)
<u>2830</u>	<u>132800</u> <u>293</u>	<u>064800</u> <u>295</u>	<u>2000</u> to <u>2892</u>
<u>2830</u>	<u>171000</u> <u>299</u>	<u>134100</u> <u>300</u>	<u>2893</u> to <u>2908</u>

9. Remarks: Three vessels were used on this survey. The ship PEIRCE
was the only one to use Hi-Fix control.

3/11/75

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY

TIDE NOTE FOR HYDROGRAPHIC SHEET

Processing Division: Atlantic Marine Center:

Hourly heights are approved for

Tide Station Used (NOAA Form 77-12): Sandwich, Massachusetts
(Boston gage inoperative)

Period: Sept. 28 - Oct. 30, 1971

HYDROGRAPHIC SHEET: H-9233

OPR: 473

Locality: Off the eastern coast of Cape Cod

Plane of reference (mean ~~lower~~ low water): 5.6 ft.

Height of Mean High Water above Plane of Reference is 6.8 ft.

Remarks: Recommended zoning:

Range ratio

Time Correction

From $41^{\circ}54.5'$ to $41^{\circ}56'$ x 0.80 North of $41^{\circ}51'$ + 15 min

From $41^{\circ}53'$ to $41^{\circ}54'.5$ x 0.78 South of $41^{\circ}51'$ + 30 min

South of $41^{\circ}53'$ x 0.76

James R. Hubbard
for Chief, Tides Branch

GEOGRAPHIC NAMES

H-9233

Name on Survey	A ON CHART NO.										1
	B ON PREVIOUS SURVEY NO.										
	C ON U.S. QUADRANGLE MAPS										2
	D FROM LOCAL INFORMATION										
	E ON LOCAL MAPS										3
	F P.O. GUIDE OR MAP										
	G RAND McNALLY ATLAS										4
	H U.S. LIGHT LIST										
	K										5
	CHATHAM										
NAUSET BEACH											2
NAUSET HARBOR											3
NAUSET HEIGHTS											4
											5
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APPROVED

Chas. E. Harrington

CHIEF GEOGRAPHER - C3x5

13 MARCH 1979

HYDROGRAPHIC SURVEY STATISTICS

H-9233

RECORDS ACCOMPANYING SURVEY: To be completed when survey is registered.

RECORDS ACCOMPANYING SURVEY TO BE COMPLETED WHEN SURVEY IS REGISTERED						
RECORD DESCRIPTION			AMOUNT	RECORD DESCRIPTION		AMOUNT
SMOOTH SHEET			1	BOAT SHEETS & PRELIMINARY OVERLAYS		1
DESCRIPTIVE REPORT			1	SMOOTH OVERLAYS: POS. ARC, EXCESS		2
DESCRIP- TION	DEPTH RECORDS	HORIZ. CONT. RECORDS	PRINTOUTS	TAPE ROLLS	PUNCHED CARDS	ABSTRACT SOUNDING DOCUMENT
ENVELOPES			1			1-misc. data
CAHIERS	1 with P.O.'s		1			
VOLUMES	3					
BOXES						

T-SHEET PRINTS (List) TP-00169 thru TP-00171 1:10,000 reduced to 1:20,000

SPECIAL REPORTS (List)

OFFICE PROCESSING ACTIVITIES

The following statistics will be submitted with the cartographer's report on the survey

PROCESSING ACTIVITY	AMOUNTS		
	PRE- VERIFICATION	VERIFICATION	TOTAL
POSITIONS ON SHEET			1842
POSITIONS CHECKED		200	
POSITIONS REVISED		14	
SOUNDINGS REVISED		280	
SOUNDINGS ERRONEOUSLY SPACED			
SIGNALS (CONTROL) ERRONEOUSLY PLOTTED		0	
TIME - HOURS			
CRITIQUE OF FIELD DATA PACKAGE (PRE-VERIFICATION)			
VERIFICATION OF CONTROL		16	
VERIFICATION OF POSITIONS		15	
VERIFICATION OF SOUNDINGS		100	
COMPILATION OF SMOOTH SHEET		53	
APPLICATION OF TOPOGRAPHY		10	
APPLICATION OF PHOTOBATHYMETRY		0	
JUNCTIONS		4	
COMPARISON WITH PRIOR SURVEYS & CHARTS		0	
VERIFIER'S REPORT		0	
OTHER		0	
TOTALS		108	
Pre-Verification by	Beginning Date	Ending Date	
Verification by W. Guy, F. Saunders, R. Roberson	Beginning Date 12/30/74	Ending Date 06/03/76	
Verification Check by G. P. Trefethen	Time (Hours) 4	Date 03/27/78	
Marine Center Inspection by / Review by CATEGORY II / <i>A. Guenlar</i>	Time (Hours) 178	Date 9-2-78	
Quality Control Inspection by <i>X. W. Wellman</i>	Time (Hours) 51 hrs	Date 1-24-79	
Requirements Evaluation by	Time (Hours)	Date	

✓ ENGLE 104rs. 3-23-77

OFFICE OF MARINE SURVEYS AND MAPS
HYDROGRAPHIC SURVEYS DIVISION
MODIFIED HYDROGRAPHIC SURVEY REVIEW

REGISTRY NO. H-9233

FIELD NO. PE-20-3-71

Massachusetts, Cape Cod, Nauset Beach Lighthouse to Chatham

SURVEYED: September 28 - October 30, 1971

SCALE: 1:20,000

PROJECT NO.: OPR-473

SOUNDINGS: DE-723 Depth Recorder
and 16-Foot Pole

CONTROL: Hi-Fix (Range-Range)
and Sextant Fixes
on Shore Signals

Chief of Party	B. I. Williams
Surveyed by	P. S. Hudes
.....	T. W. Richards
Automated Plot by	Calcomp Plotter (AMC)
Verified by	W. Guy, F. Saunders, and
.....	R. Roberson
Reviewed by	L. Quinlan
	Date: September 21, 1978
Cursory inspection made--survey	K. W. Wellman
processing considered complete	January 24, 1979

1. Control and Shoreline

The origin of the control is adequately discussed in part F of the Descriptive Report.

The shoreline originates with final reviewed topographic manuscripts TP-00169, TP-00170, and TP-00171 of 1970-1972.

The mean high water line is shown for guidance only. Its true position is shown on the topographic manuscripts previously mentioned. However, the erosion of a portion of the shoreline (vicinity of latitude $41^{\circ}48.80'$, longitude $69^{\circ}56.40'$) subsequent to the date of aerial photography resulted in conflict between the shoreline as shown on TP-00170 and present survey hydrography. Accordingly, the shoreline in the affected area is delineated by a red dashed line to reconcile the conflict. It is noted that the mean high water line is migratory due to the shifting sands which characterize the present survey area.

2. Hydrography

- a. Depths at crossings are in good agreement.
- b. The usual depth curves are adequately delineated. A few brown supplemental depth curves were added to emphasize shoaler depths along the crest of the linear shoal which parallels the shoreline south of latitude $41^{\circ}46'$.
- c. The development of the bottom configuration and investigations of least depths are considered adequate.

3. Condition of Survey

The sounding records, smooth plotting, Descriptive Report, and printouts are adequate and conform to the requirements of the Hydrographic Manual and the Instruction Manual - Automated Hydrographic Surveys except as follows:

- a. Junctional depth curves were not adequately reconciled during verification. It was, therefore, necessary to reexamine and revise selected depth curves during the review in order to effect adequate junctions.
- b. The hydrographer neglected to assign unique identification numbers to the two stations used as sites for the electronic control stations. Further, the signals are not included in the formal list of signals. In addition, no formal report pertaining to the establishment of the electronic control used in the present survey is available, thus precluding any verification of the positions of the referenced electronic control stations. The referenced stations are considered to have been suitably established since no conflicts indicative of "control" problems were noted during processing. Accordingly, suitable identification numbers have been assigned to the two electronic control stations and appropriate additions to the signal list have been effected.

4. Junctions

An adequate junction has been effected with H-9232 (1971) on the northeast. Junctional survey H-9226 (1971) on the northwest is not presently available. The adequacy of its junction with the present survey will be discussed in its Review Report. The southern limits of the present survey development also comprise the project limits. The depths in this vicinity indicate a shift in the nearshore bottom features. Present depths exceeding 30 feet, however, are in general harmony with charted depths in the area.

5. Comparison with Prior Surveys

a.	H-519	(1855-56)	1:40,000
	H-570	(1856)	1:40,000
	H-1726	(1886)	1:10,000
	H-1817	(1887)	1:10,000
	H-1818	(1887)	1:10,000
	H-1901	(1888)	1:10,000
	H-1902	(1888)	1:10,000
	H-5276	(1932)	1:100,000
	H-8349	(1956)	1:10,000
	H-8350	(1956)	1:40,000

These prior surveys cover the area of the present survey. A comparison between the present and prior surveys reveals a variable pattern of depth differences of as much as ± 24 feet. The shoreline in the common area has generally receded, as much as 190 meters in some places. Two more significant changes in the area are noted as follows:

(1) The entrance to Nauset Harbor, formerly located in the vicinity of latitude $41^{\circ}47'54''$, longitude $69^{\circ}56'09''$, has migrated approximately 1,400 meters to the north since 1887.

(2) A continuous shoreline now exists in the vicinity of latitude $41^{\circ}41'18''$, longitude $69^{\circ}56'00''$ where a former inlet with depths of as much as 23 feet has been filled in by shoreline accretion in the area.

The noted depth and shoreline changes are attributed to natural causes. A few bottom characteristics were carried forward from prior survey H-1902 to supplement the present survey. With these additions, the more completely developed present survey is adequate to supersede the prior surveys within the common area.

b. F.E. No. 3 (1960) W.D. 1:20,000

This wire-drag survey covers a small area of the southern limits of the present survey. One present survey depth of 31 feet (vicinity of latitude $41^{\circ}41'21''$, longitude $69^{\circ}54'41''$) falls within an area cleared to 32 feet in 1960. Such a minor conflict might ordinarily be considered acceptable due to the limitations of wire-drag field procedures which might result in an undetected grounding in such circumstances. However, in consideration of the changeable nature of the present survey area, the cleared depths of 32 feet in the immediate vicinity of the noted conflict should be considered presently invalid.

Except as noted above, present depths are in general harmony with cleared wire-drag depths within the common area.

6. Comparison with Chart 13246 (1208), 22nd Edition, January 14, 1978

a. Hydrography

The charted hydrography originates with depths from the previously discussed prior surveys which require no further consideration supplemented by the partial application of the present survey boat sheet.

Attention is directed to the following:

(1) The Dangerous Wreck, Presurvey Review Item 5, charted in the vicinity of latitude $41^{\circ}42'30''$, longitude $69^{\circ}51'10''$, originating with Local Notice to Mariners 41 of 1917, was not investigated during the present survey. This Presurvey Review item is not verified or disproved by the present survey development. It is recommended that this wreck be charted as a NONDANGEROUS wreck since it falls in general depths of 90 feet.

(2) The submerged wreck (PA) charted in the vicinity of latitude $41^{\circ}49'45''$, longitude $69^{\circ}52'46''$ originates with Local Notice to Mariners 52 of 1976, subsequent to the date of the present survey. It should be retained as charted.

(3) The submerged wave guage (PA) charted in the vicinity of latitude $41^{\circ}51'42''$, longitude $69^{\circ}56'30''$ originates with Local Notice to Mariners 42 of 1973, subsequent to the date of the present survey. It should be retained as charted.

(4) The Dolphin PA and Overhead Cable authorized clearance 10 feet charted in the vicinity of latitude $41^{\circ}41'48''$, longitude $69^{\circ}55'30''$ originate with Chart Letters 1152 (77) and 1385 (77) subsequent to the date of the present survey. They should be retained as charted.

(5) The note "Hydrography to northward from surveys of 1886-1888 and 1971" will no longer be necessary due to the supersession of those prior surveys. The referenced note should be deleted during the application of the present survey depths to the chart.

(6) The 114-foot depth and accompanying 120-foot curve charted in latitude $41^{\circ}44'16''$, longitude $69^{\circ}50'15''$ is the result of erroneous conversion from fathoms to feet and should be deleted from the chart.

With the exception of items (1) through (4) above, the present survey supersedes the charted hydrography within the common area.

b. Aids to Navigation

The position of buoy R"6" shown on the present survey in the vicinity of latitude 41°41'13", longitude 69°50'05" falls approximately 250 meters to the northwest of the charted position. The charted position adequately serves the intended purpose.


7. Compliance with Instructions

With the exception of insufficient bottom samples taken inshore, this survey adequately complies with the project instructions.


8. Additional Field Work

This is a good basic survey and requires no additional field work.

Examined and Approved:



Chief
Hydrographic Surveys Division



Associate Director
Office of Marine Surveys
and Maps

REGISTRY NO. _____

The Computer and Excess Sounding Cards for this survey have not been corrected to reflect the changes made to the Computer Card and Excess Card Printouts at this time of the review.

When the cards have been updated to reflect the final results of the survey, the following shall be completed:

CARDS CORRECTED

DATE _____ TIME REQUIRED _____ INITIALS _____

REMARKS:

REGISTRY NO. H-9233

The magnetic tape containing the data for this survey has not been corrected to reflect the changes made during evaluation and review.

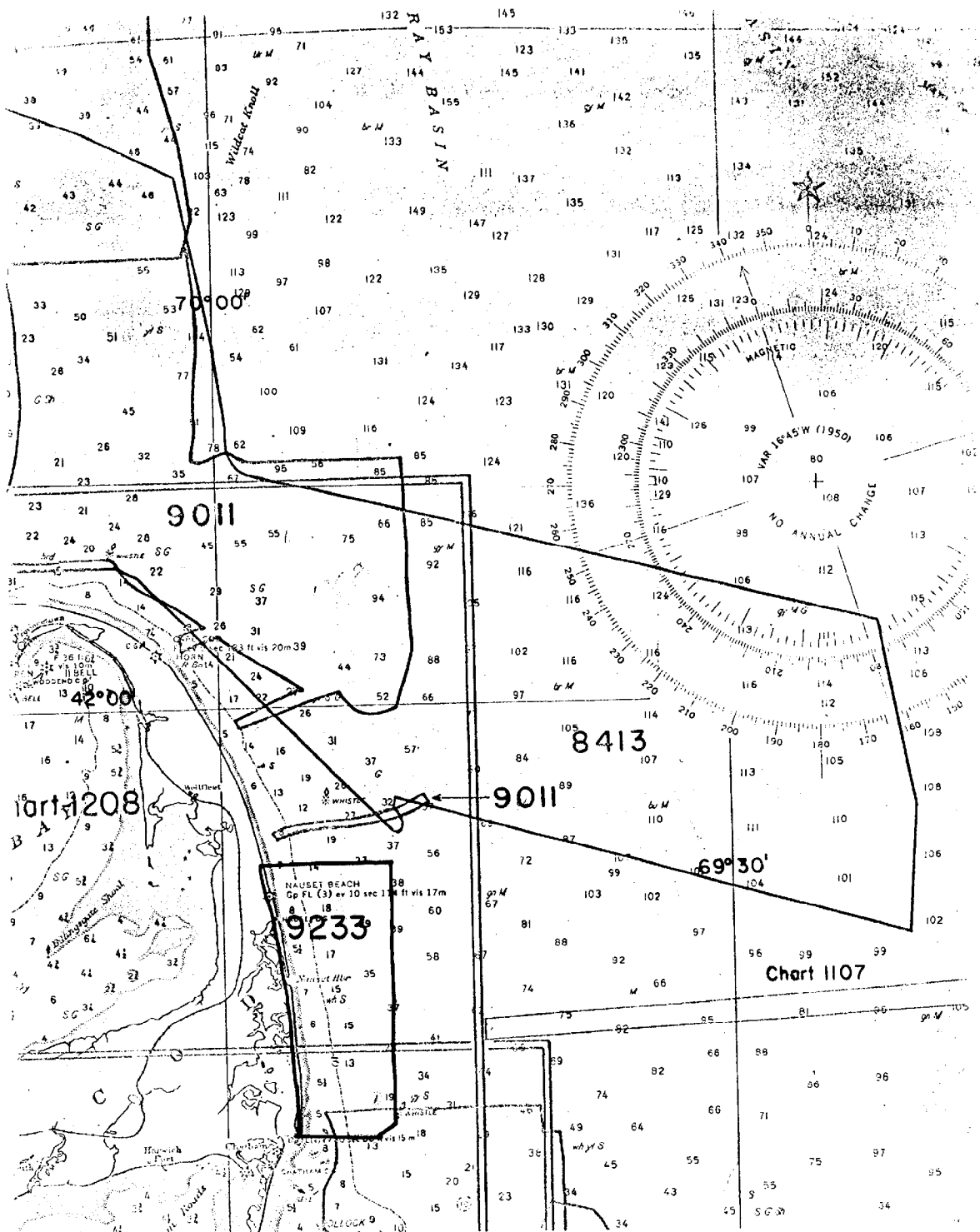
When the magnetic tape has been updated to reflect the final results of the survey, the following shall be completed:

MAGNETIC TAPE CORRECTED

DATE _____ TIME REQUIRED _____ INITIALS _____

REMARKS:

During update the two electronic control stations should be added to the signal data bank as per the positions and signal numbers (signal numbers 377 and 379) shown in red on the signal list included in the Descriptive Report.



Verification Notes
H-9233 PE-20-3-71 OPR-473
Category II Survey

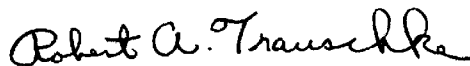
This appears to be a very good basic survey.

Crosslines are in good agreement and satisfactory junctions were accomplished with surveys H-9226 and H-9232.

The depth curves are adequate to delineate the general features in this area of irregular bottom.

The various problems encountered during verification for this survey may be found in the enclosed Atlantic Marine Center plotter notes to EDP.

Respectfully Submitted,

A handwritten signature in cursive script, reading "Robert A. Trauschke".

Robert A. Trauschke, CDR, NOAA
Chief, Processing Division, AMC

RECORD OF APPLICATION TO CHARTS

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. H-9233

INSTRUCTIONS

A basic hydrographic or topographic survey supersedes all information of like nature on the uncorrected chart.

1. Letter all information.
2. In "Remarks" column cross out words that do not apply.
3. Give reasons for deviations, if any, from recommendations made under "Comparison with Charts" in the Review.

CHART	DATE	CARTOGRAPHER	REMARKS
13237	6-5-79	H. Radde	Full Part Before After Verification Review Inspection Signed Via Drawing No. 46 Examined No corr
13248	8-23-79	H. Radde	Full Part Before After Verification Review Inspection Signed Via Drawing No. Complete hydrography revision
13246	8-29-79	R. Wilson	Full Part Before After Verification Review Inspection Signed Via Drawing No. 38
13200	8-30-79	R. Wilson	Full Part Before After Verification Review Inspection Signed Via Drawing No. 33
13003 (1000)	9/30/80	B. Loretz	Full Part Before After Verification Review Inspection Signed Via Drawing No. #57 APPLIED thru ¹⁹⁶⁰ Reduction cht.
13006 (70)	6-23-81	R. Windfeld	13200, ADDED 11 Sdg. & Chg. DANG. WRECK to NEW DAN Full Part Before After Verification Review Inspection Signed Via Drawing No. 45
13009	6-26-81	D. Wyke	Full Part Before After Verification Review Inspection Signed Via Drawing No. 35 Appl. thru cht 13200
			Full Part Before After Verification Review Inspection Signed Via Drawing No.
			Full Part Before After Verification Review Inspection Signed Via Drawing No.
			Full Part Before After Verification Review Inspection Signed Via Drawing No.